

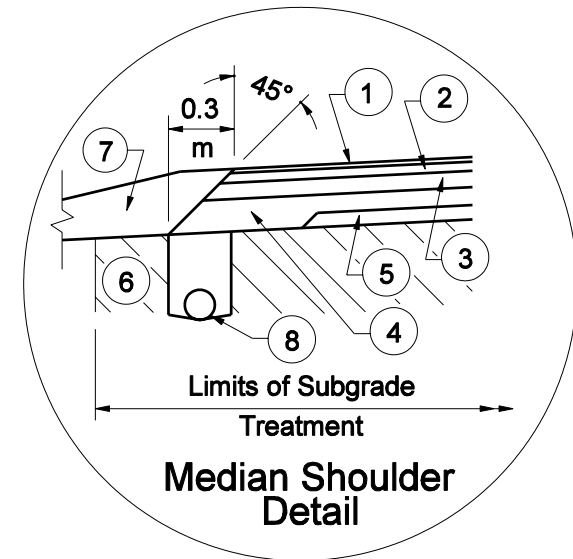
**\* All Pavement, Including All Shoulders**

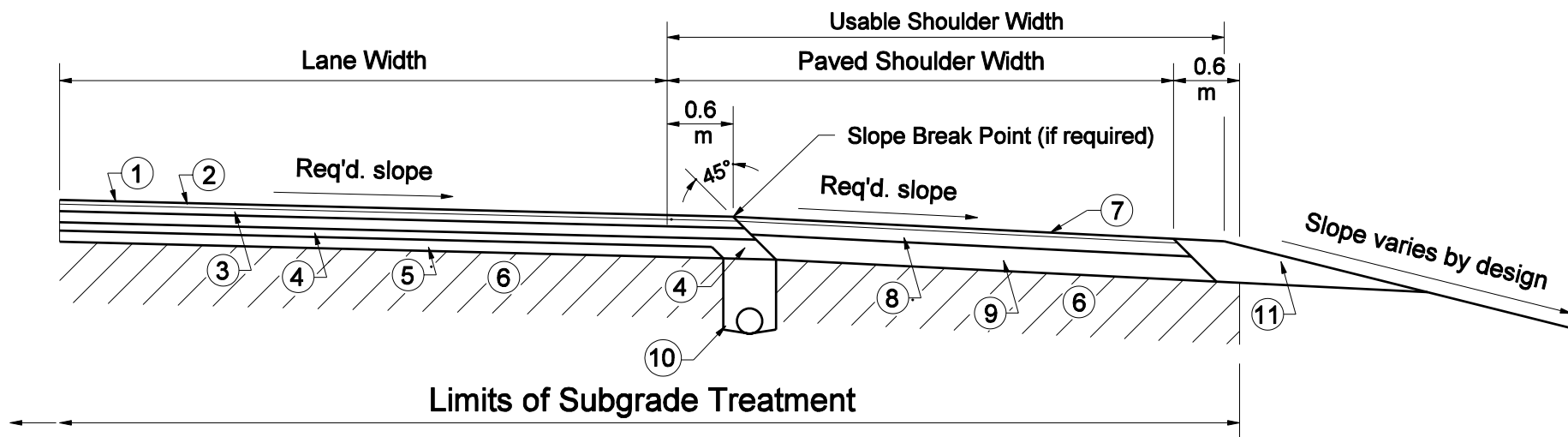
- ① 90 kg/m<sup>2</sup> HMA Surface 9.5 mm
- ② 150 kg/m<sup>2</sup> HMA Intermediate 19.0 mm
- ③ 240 kg/m<sup>2</sup> Minimum HMA Base 25.0 mm
- \*\* ④ 250 kg/m<sup>2</sup> QC/QA-HMA Intermediate OG25.0 mm
- ⑤ 240 kg/m<sup>2</sup> HMA Base 25.0 mm
- ⑥ Subgrade Treatment
- ⑦ Variable-Depth Compacted Aggregate, No. 53
- ⑧ Pipe, Type 4, Circular, 150 mm

\* Open graded mixtures OG19.0 mm or OG25.0 mm should be QC/QA-HMA, 5, 76. For all other mixtures, see Section 52-9.02 to determine the appropriate HMA mixture designation.

\*\* Where underdrains are not required, Intermediate OG25.0 mm mix should be replaced with HMA Base 25.0 mm, minimum 270 kg/m<sup>2</sup>.

**FULL DEPTH HMA PAVEMENT,  
≥ 30 MILLION ESALs  
Figure 52-13A**





### \* Mainline

- ① 90 kg/m<sup>2</sup> HMA Surface 9.5 mm
- ② 150 kg/m<sup>2</sup> HMA Intermediate 19.0 mm
- ③ 240 kg/m<sup>2</sup> Minimum HMA Base 25.0 mm
- \*\* ④ 165 kg/m<sup>2</sup> QC/QA-HMA Intermediate OG25.0 mm
- ⑤ 240 kg/m<sup>2</sup> HMA Base 25.0 mm
- ⑥ Subgrade Treatment
- ⑩ Pipe, Type 4, Circular, 150 mm

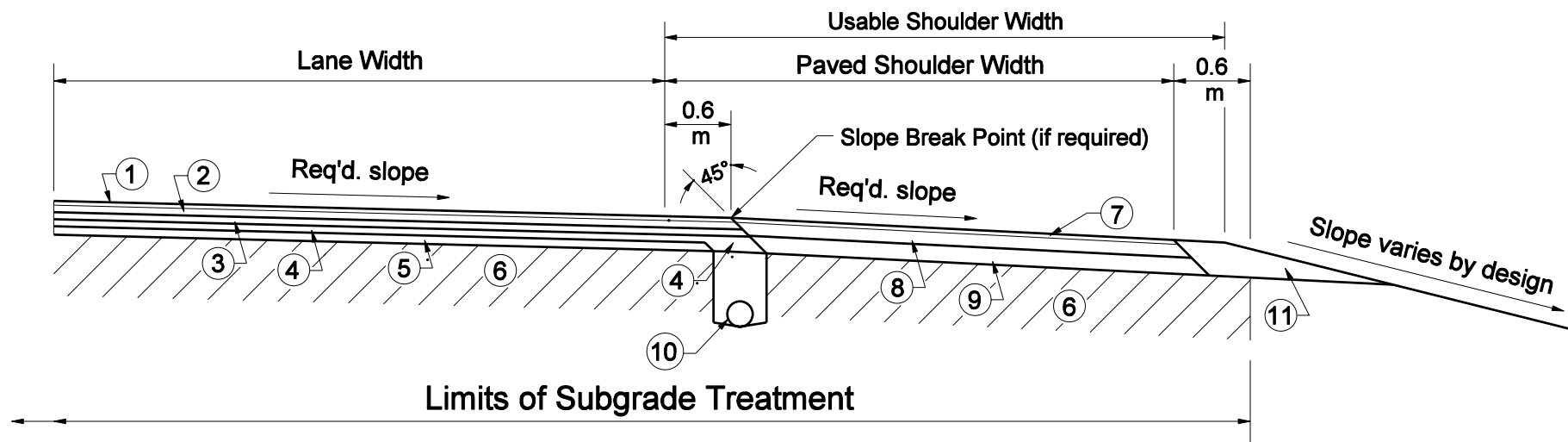
\* Open graded mixtures OG19.0 mm or OG25.0 mm should be QC/QA-HMA, 5, 76. For all other mixtures, see Section 52-9.02 to determine the appropriate HMA mixture designation.

### \* Shoulders

- ⑦ 90 kg/m<sup>2</sup> HMA Surface 9.5 mm
- ⑧ 270 kg/m<sup>2</sup> HMA Base 25.0 mm
- ⑨ Compacted Aggregate, No. 53, Base  
(Depth equals mainline HMA thickness minus 150 mm)
- ⑪ Variable-Depth Compacted Aggregate, No. 53

\*\* Where underdrains are not required, QC/QA-HMA Intermediate OG25.0 mm mix should be replaced with HMA Base 25.0 mm, 180 kg/m<sup>2</sup>.

FULL DEPTH HMA PAVEMENT,  
10 MILLION ≤ ESALs < 30 MILLION  
Figure 52-13B



**\* Mainline Pavement (Section With Shoulders)**

- ① 90 kg/m<sup>2</sup> HMA Surface 9.5 mm
- ② 150 kg/m<sup>2</sup> HMA Intermediate 19.0 mm
- ③ 150 kg/m<sup>2</sup> Minimum HMA Base 19.0 mm
- \*\* ④ 140 kg/m<sup>2</sup> QC/QA-HMA Intermediate OG19.0 mm
- ⑤ 180 kg/m<sup>2</sup> QC/QA-HMA Base 19.0 mm
- ⑥ Subgrade Treatment
- ⑩ Pipe, Type 4, Circular, 150 mm

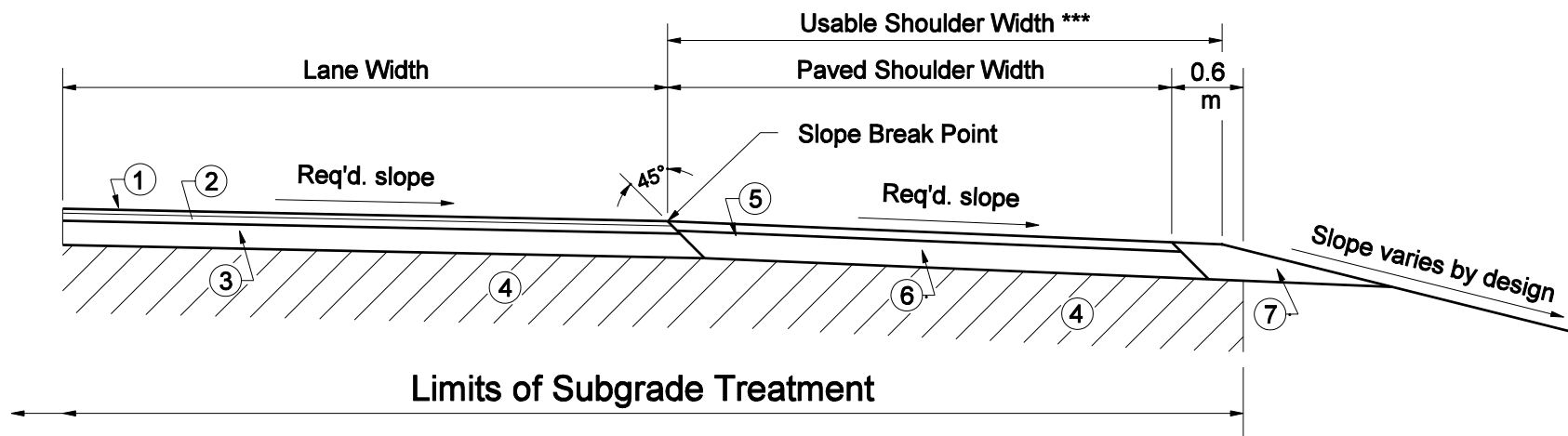
**\* Shoulders**

- ⑦ 90 kg/m<sup>2</sup> HMA Surface 9.5 mm
- ⑧ 270 kg/m<sup>2</sup> HMA Base 25.0 mm
- ⑨ Compacted Aggregate, No.53, Base  
(Depth equals mainline HMA thickness minus 150 mm)
- ⑪ Variable-Depth Compacted Aggregate, No. 53

\* Open graded mixtures OG19.0 mm or OG25.0 mm should be QC/QA-HMA, 5, 76. For all other mixtures, see Section 52-9.02 to determine the appropriate HMA mixture designation.

\*\* Where underdrains are not required, QC/QA-HMA Intermediate OG19.0 mm mix should be replaced with HMA Base 19.0 mm, 150 kg/m<sup>2</sup>.

FULL DEPTH HMA PAVEMENT,  
1 MILLION ≤ ESALs < 10 MILLION  
Figure 52-13C



**\* Mainline (Section With Shoulders)**

- ① 90 kg/m<sup>2</sup> HMA Surface 9.5 mm
- ② 150 kg/m<sup>2</sup> HMA Intermediate 19.0 mm
- \*\* ③ 480 kg/m<sup>2</sup> HMA Base 25.0 mm
- ④ Subgrade Treatment

**\* Shoulders**

- ⑤ 180 kg/m<sup>2</sup> HMA Surface 9.5 mm
- ⑥ 225 mm Compacted Aggregate, No. 53, Base
- Or ⑤ & ⑥ may be replaced by  
300 mm Minimum Compacted Aggregate, No. 53, Base
- ⑦ Variable-Depth Compacted Aggregate, No. 53

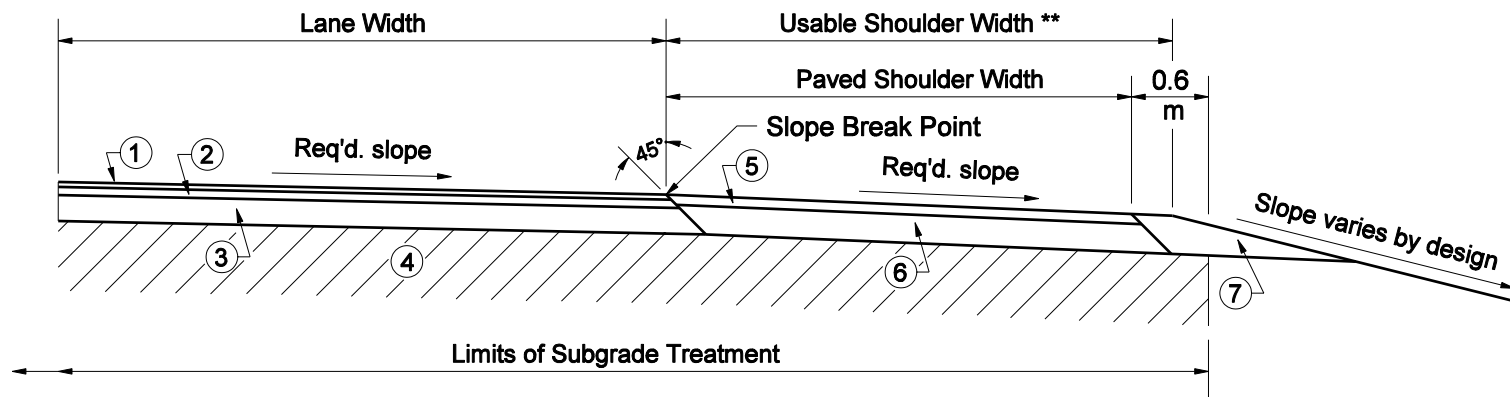
\* Where underdrains are not required, see Figure 52-13C.

\*\* See Section 52-9.02 to determine the appropriate HMA mixture designation.

\*\*\* Earth may be substituted for compacted aggregate dependent on geometric requirements for the usable shoulder width outside the paved area.

**FULL DEPTH HMA PAVEMENT, < 1 MILLION ESALs**

**Figure 52-13D**



**\* Mainline (Section With Shoulders)**

- ① 90 kg/m<sup>2</sup> HMA Surface 9.5 mm
- ② 150-330 kg/m<sup>2</sup> HMA Intermediate 19.0 mm
- ③ 125-200 mm Compacted Aggregate Base
- ① + ② + ③ ≥ 300 mm
- ④ Subgrade Treatment

\* See Section 52-9.02 to determine the appropriate HMA mixture designation.

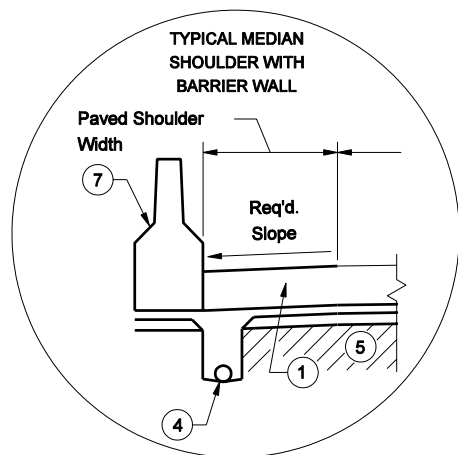
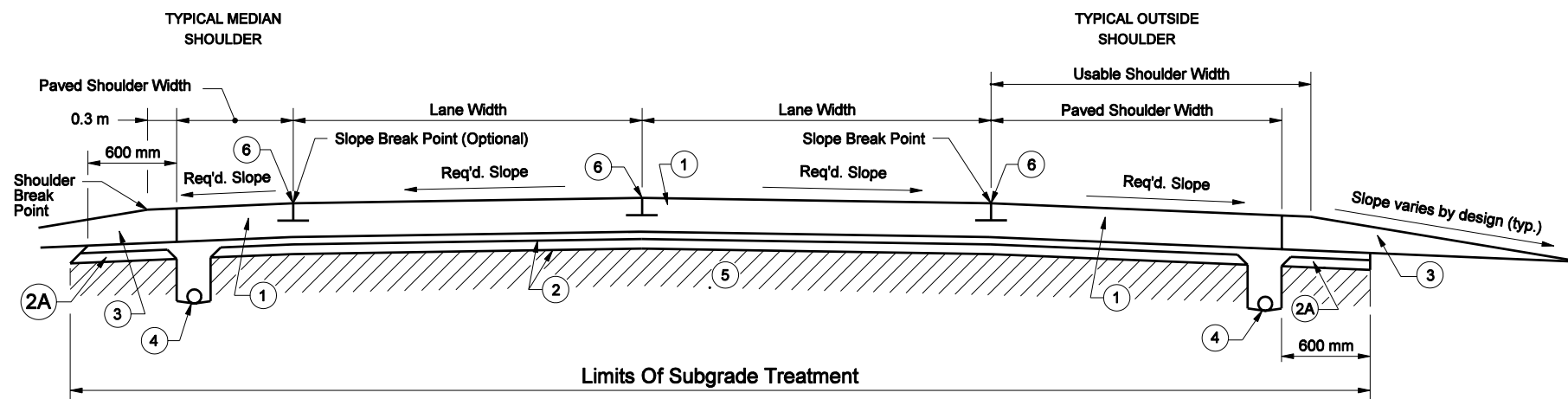
\*\* Earth may be substituted for compacted aggregate dependent on geometric requirements for the usable shoulder width outside the paved area.

**\*\* Shoulders**

- ⑤ 180 kg/m<sup>2</sup> HMA Surface 9.5 mm
- ⑥ 225 mm Compacted Aggregate, No. 53, Base
- Or ⑤ & ⑥ may be replaced by
- 300 mm Minimum Compacted Aggregate, No. 53, Base
- ⑦ Variable-Depth Compacted Aggregate, No. 53

COMPOSITE HMA / COMPACTED AGGREGATE PAVEMENT  
< 1 MILLION ESALs

Figure 52-13E



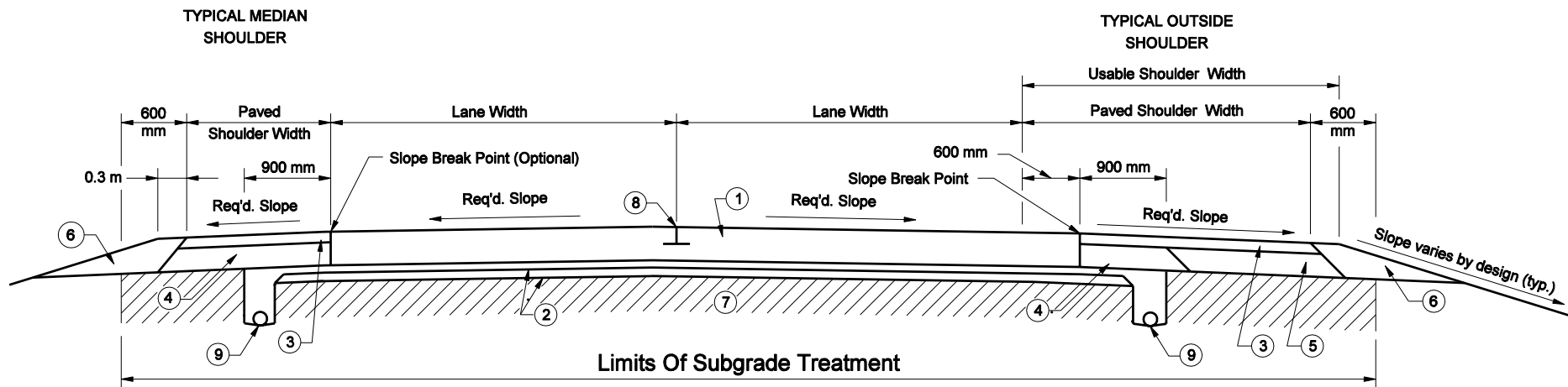
### Mainline and Shoulders

- ① PCCP
- \* ② Subbase for PCCP (75 mm Coarse Aggregate No.8 On 150 mm Coarse Aggregate No.53, Base)
- ②A 150 mm Compacted Aggregate, No. 53, Base
- ③ Variable-Depth Compacted Aggregate, No. 53
- ④ Pipe, Type 4, Circular, 150 mm
- ⑤ Subgrade Treatment
- ⑥ Longitudinal Joint or Longitudinal Construction Joint. See Figure 52-13R for Pavement Joint Options.
- ⑦ Concrete Median Barrier

\* Where underdrains are not required, Dense Graded Subbase should be used.

PCCP SECTION WITH PCC SHOULDER,  $\geq 30$  MILLION ESALs

Figure 52-13F



### Mainline

- ① PCCP
- \* ② Subbase for PCCP (75 mm Coarse Aggregate No.8 On 150 mm Coarse Aggregate No.53, Base)

### Shoulders

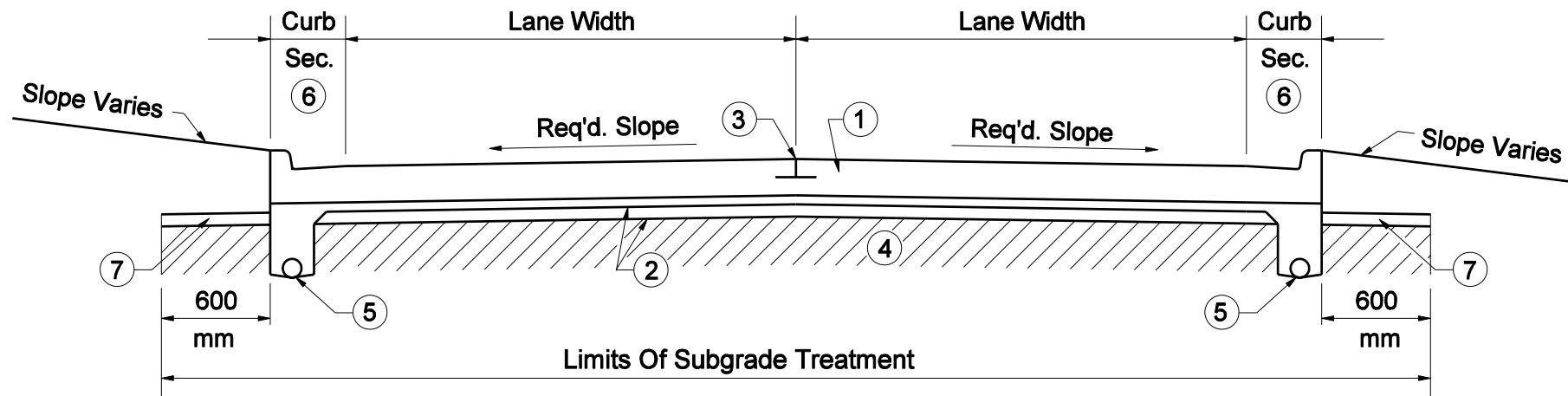
- \*\* ③ 90 kg/m<sup>2</sup> HMA Surface 9.5 mm  
180 kg/m<sup>2</sup> HMA Intermediate 19.0 mm
- \*\* ④ HMA Base 25.0 mm
- ⑤ Compacted Aggregate, No. 53, Base
- ⑥ Variable-Depth Compacted Aggregate, No. 53
- ⑦ Subgrade Treatment
- ⑧ Longitudinal Joint or Longitudinal Construction Joint
- ⑨ Pipe, Type 4, Circular, 150 mm

\* Where underdrains are not required, Dense Graded Subbase should be used.

\*\* See Section 52-9.02 to determine the appropriate HMA mixture designation.

PCCP SECTION WITH HMA SHOULDER, < 30 MILLION ESALs

Figure 52-13G



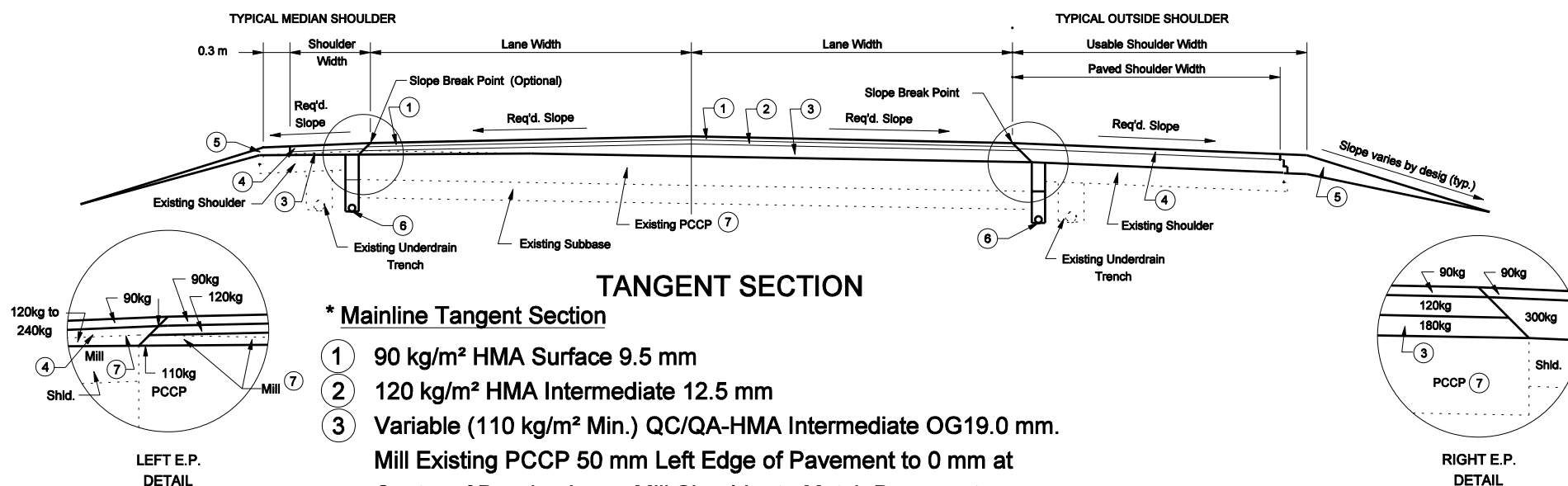
### Mainline

- (1) PCCP
  - \* (2) Subbase for PCCP (75 mm Coarse Aggregate #8 On 150 mm Coarse Aggregate #53, Base)
  - (3) Longitudinal Joint or Longitudinal Construction Joint
  - (4) Subgrade Treatment
  - (5) Pipe, Type 4, Circular, 150 mm
  - (6) See Figure 52-13Q for Geotextile Installation Requirements for Curbs (Required Only With Underdrains)
- \* Where underdrains are not required, Dense Graded Subbase should be used.
- (7) 150 mm Compacted Aggregate, No. 53, Base

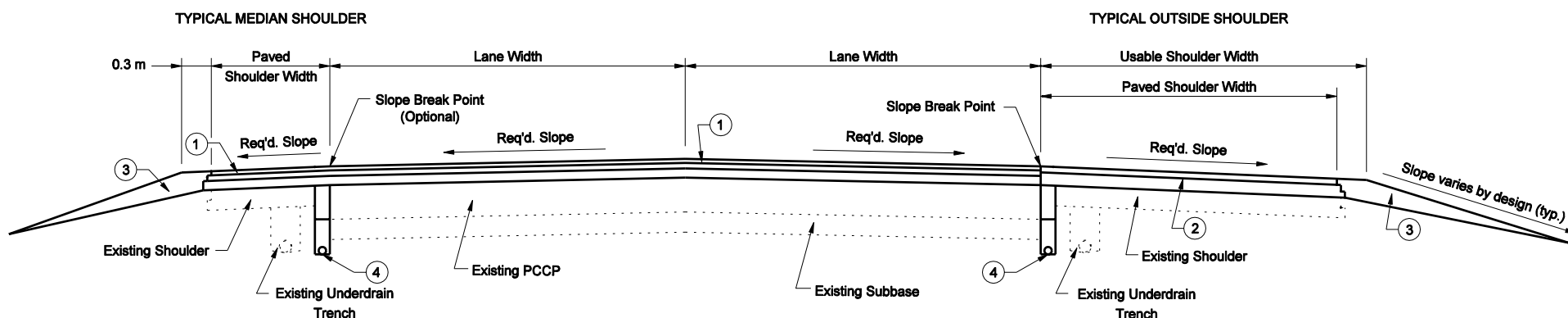
### PCCP WITH CONCRETE CURB

Figure 52-13H





**OVERLAY (TILT TO CROWN SECTION)**  
Figure 52-13 I



### \* Mainline

- ① 90 kg/m<sup>2</sup> HMA Surface 9.5 mm  
120 kg/m<sup>2</sup> HMA Intermediate 12.5 mm  
Variable depth QC/QA-HMA, 5, 76, Intermediate OG19.0 mm (110 kg/m<sup>2</sup> at Pavement Edge, 150 kg/m<sup>2</sup> at  $\mathbb{C}$ )

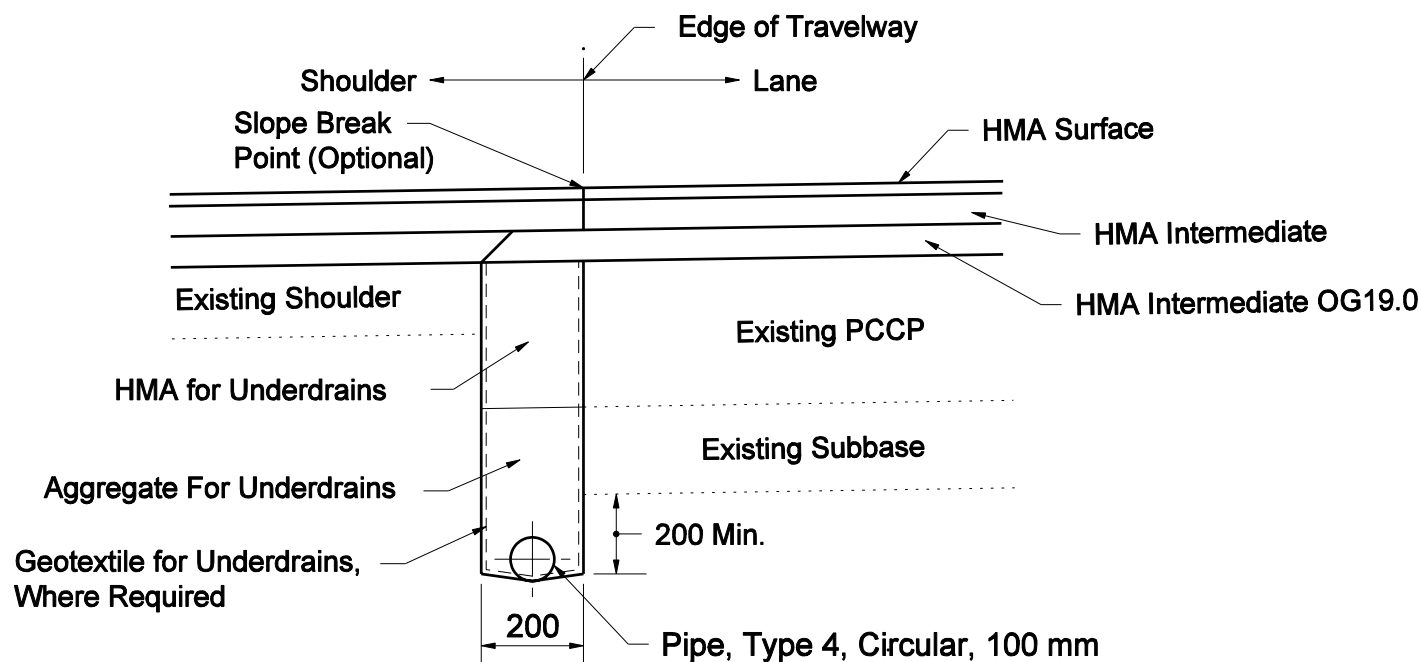
### \* Shoulder

- ② 90 kg/m<sup>2</sup> HMA Surface 9.5 mm on  
240 kg/m<sup>2</sup> HMA Base 25.0 mm
- ③ Compacted Aggregate, No. 53
- ④ Pipe, Type 4, Circular, 100 mm. See Figure 52-13K for Retrofit Underdrain Detail.

\* Open graded mixture OG19.0 mm should be QC/QA-HMA, 5, 76. For all other mixtures, see Section 52-9.02 to determine the appropriate HMA mixture designation.

OVERLAY (CROWN TO CROWN SECTION)

FIGURE 52-13J

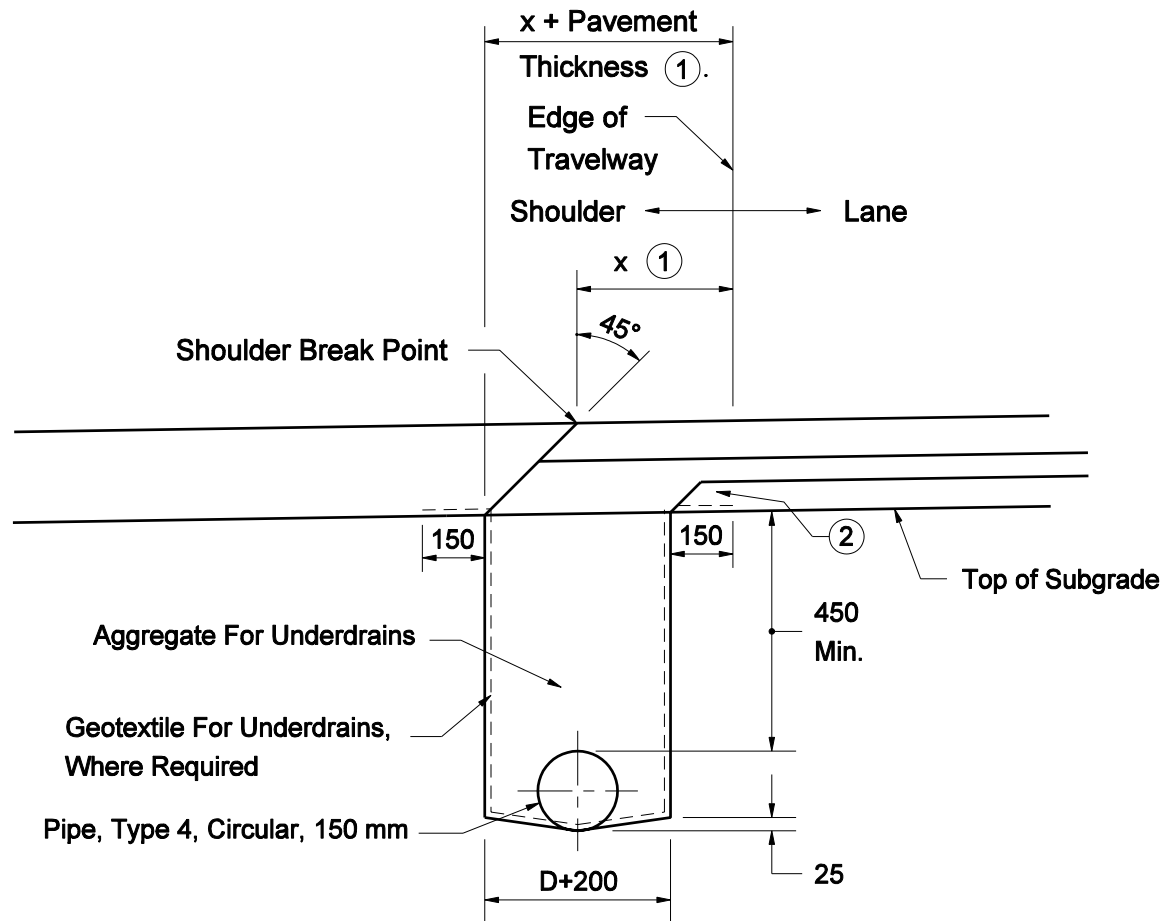


**Notes:**

1. Open graded mixture OG19.0 mm should be QC/QA-HMA, 5, 76. For all other mixtures, see Section 52-9.02 to determine the appropriate HMA mixture designation.
2. Median installation shown. Outside installation reversed as appropriate. However, slope break point is required.

## RETROFIT UNDERDRAIN

Figure 52-13K

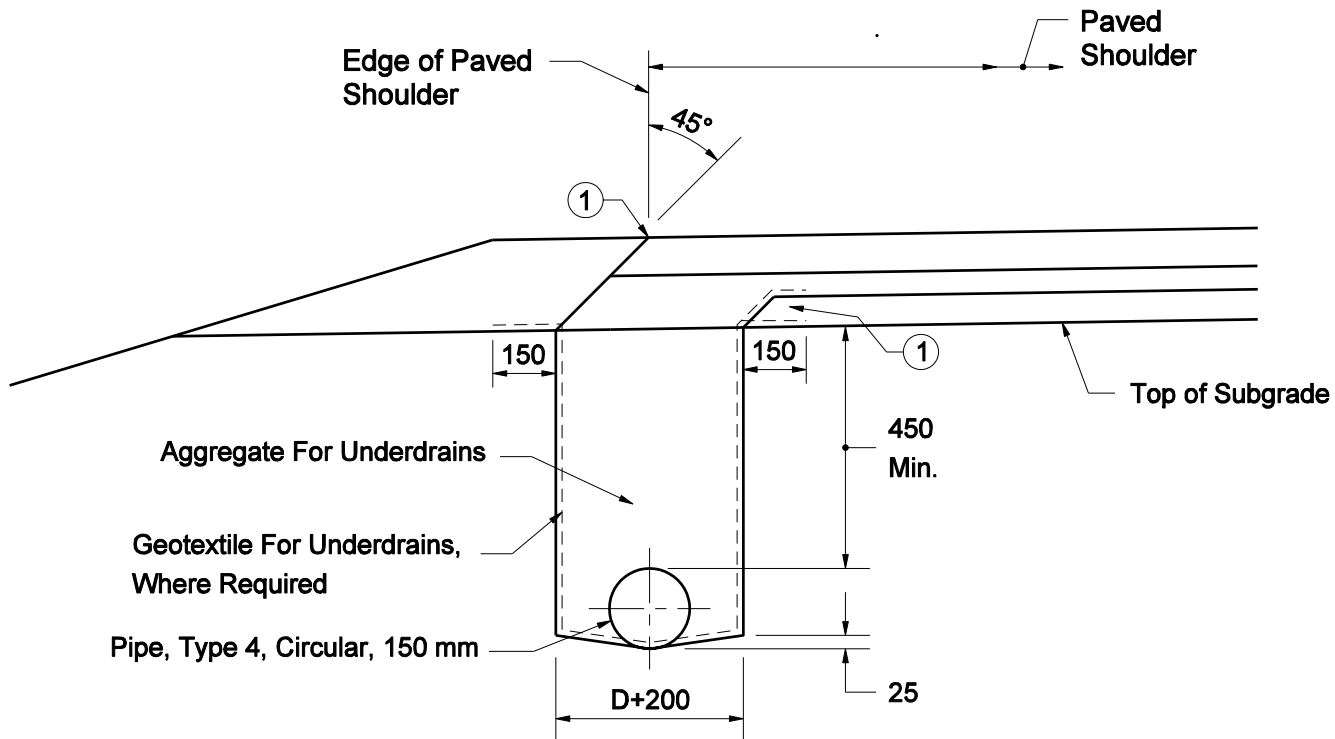


- ① Dimension x is 0.6 m min., 1.2 m max. See Fig. 45-1A(1).
- ② Where a HMA Base 25.0 mm course is used, the geotextile fabric shall extend under the course.
3. Median Installation shown. ● Outside Installation Reversed as Applicable.

All dimensions are in mm unless otherwise noted

## UNDERDRAIN FOR HMA PAVEMENT ≥ 30 MILLION ESALs

Figure 52-13L

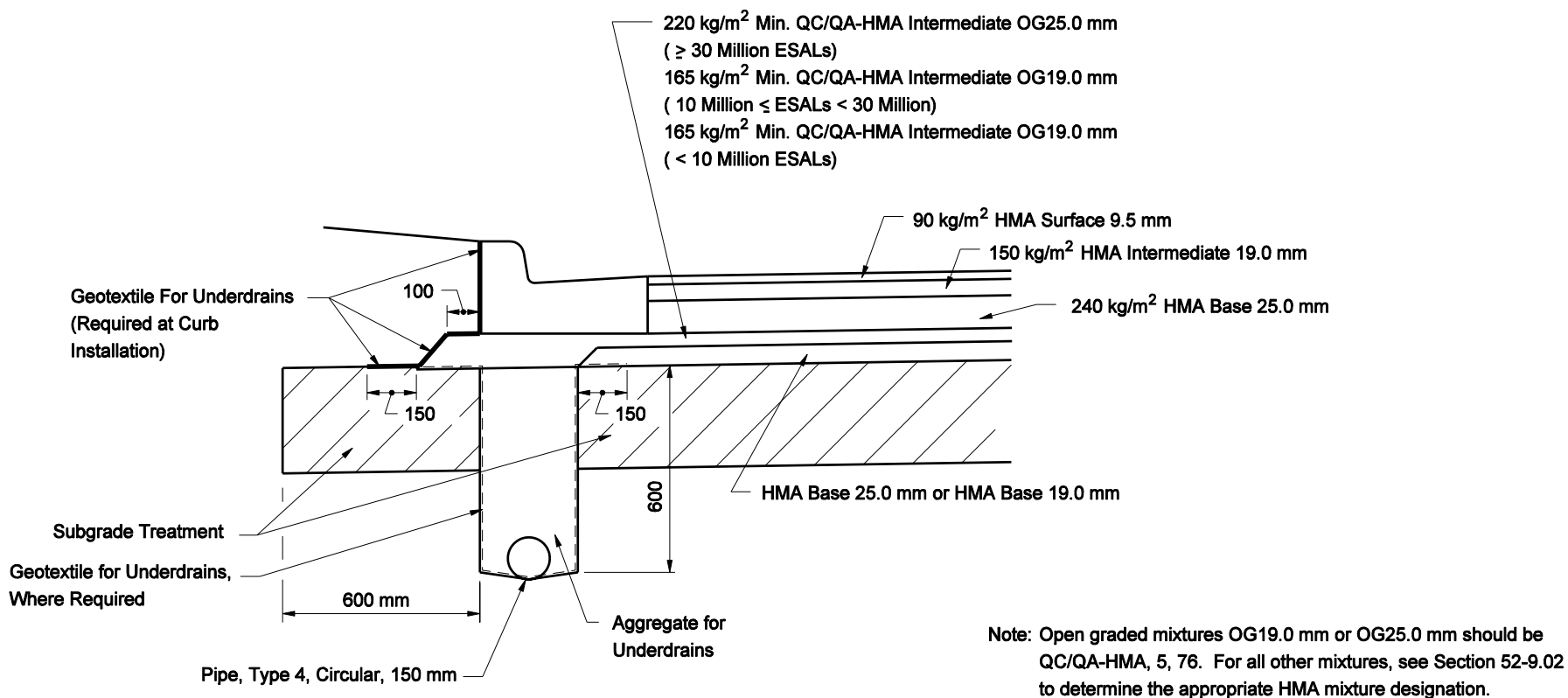


- ① Where a HMA Base 25.0 mm course is used, the geotextile fabric shall extend under the course.
2. Median Installation shown. Outside Installation Reversed as Applicable.

## UNDERDRAIN FOR HMA PAVEMENT ≥ 30 MILLION ESALs

Figure 52-13M

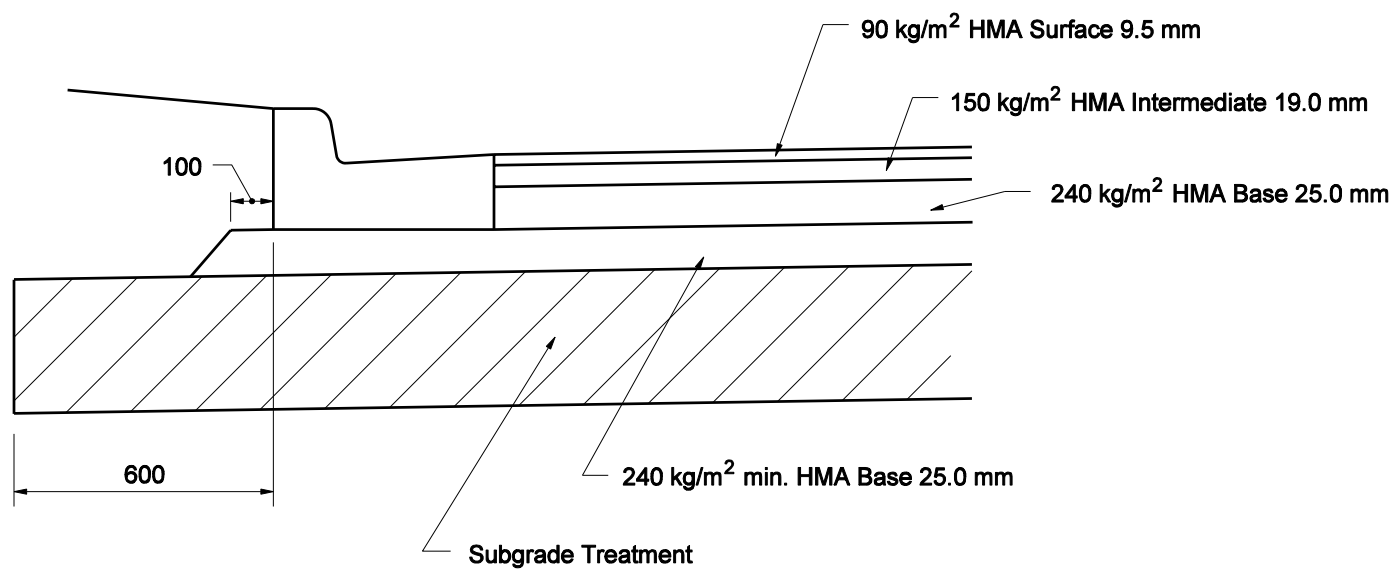
All dimensions are in mm unless otherwise noted



# CONCRETE CURB AND GUTTER SECTION FOR HMA PAVEMENT WITH UNDERDRAIN

Figure 52-13N

All dimensions are in mm unless otherwise noted

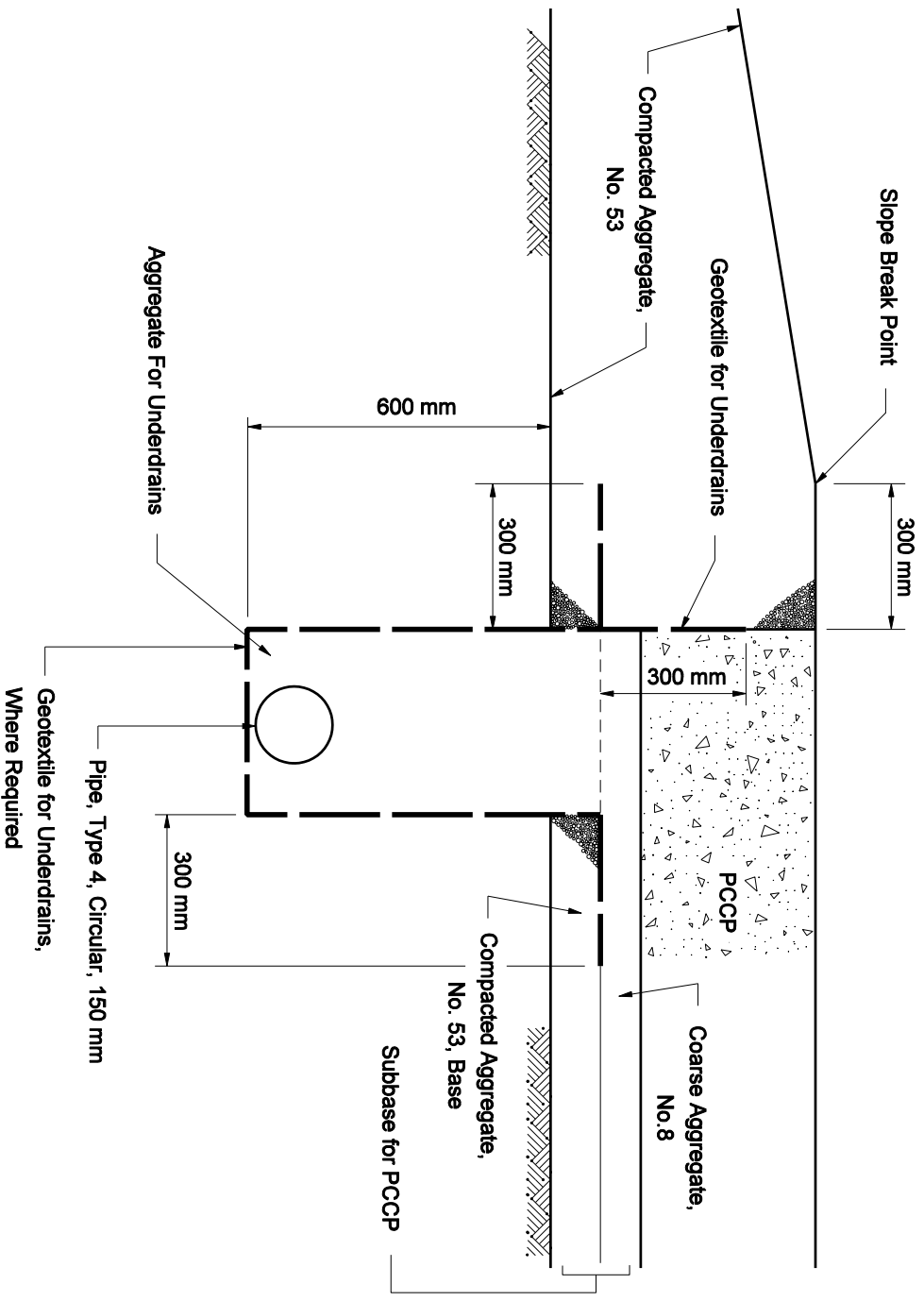


Note: See Section 52-9.02 to determine the appropriate HMA mixture designation.

### CONCRETE CURB AND GUTTER SECTION FOR HMA PAVEMENT WITHOUT UNDERDRAIN

Figure 52-13 O

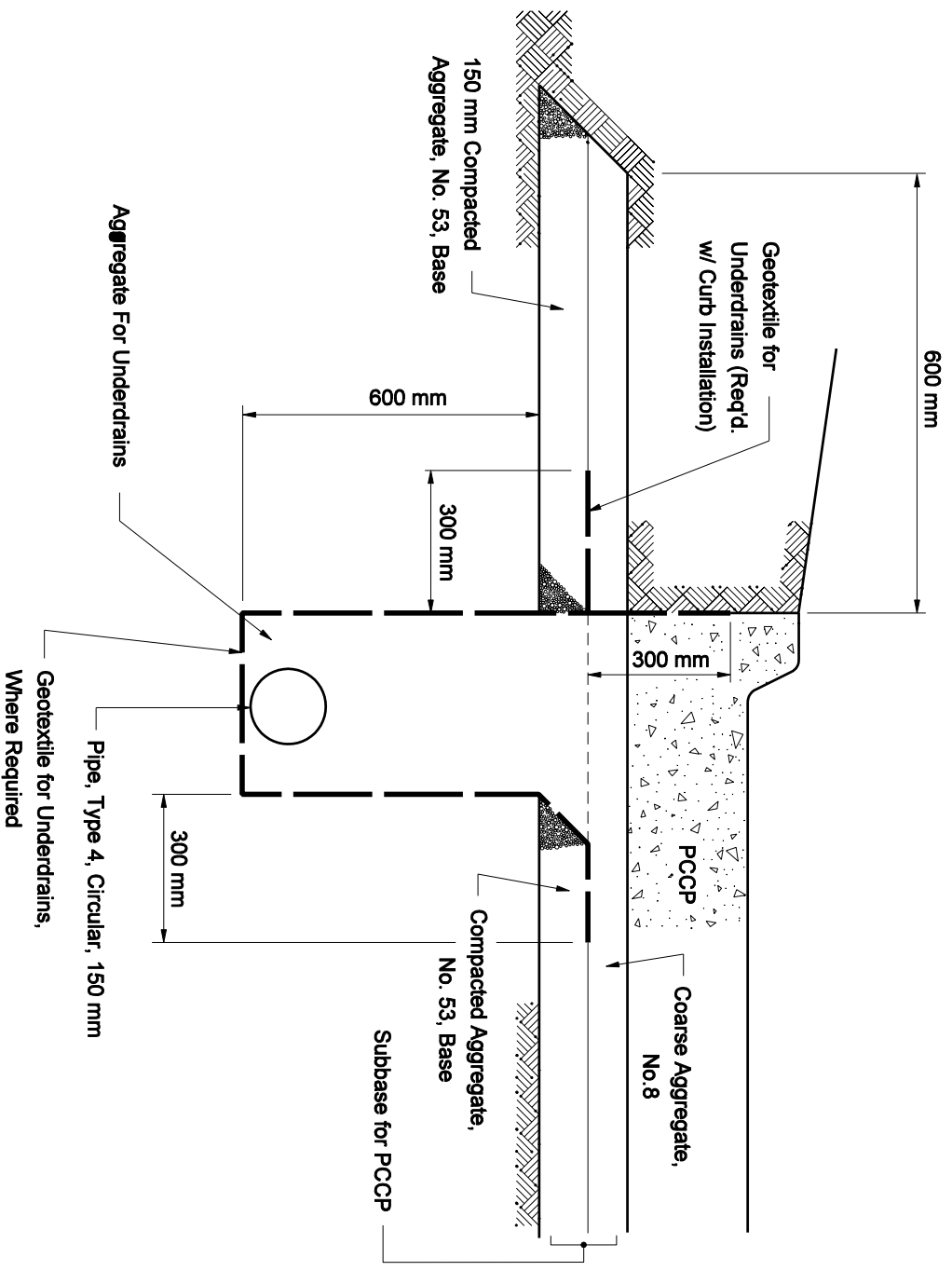
All dimensions are in mm unless otherwise noted



PCCP WITH UNDERDRAIN

Figure 52-13P



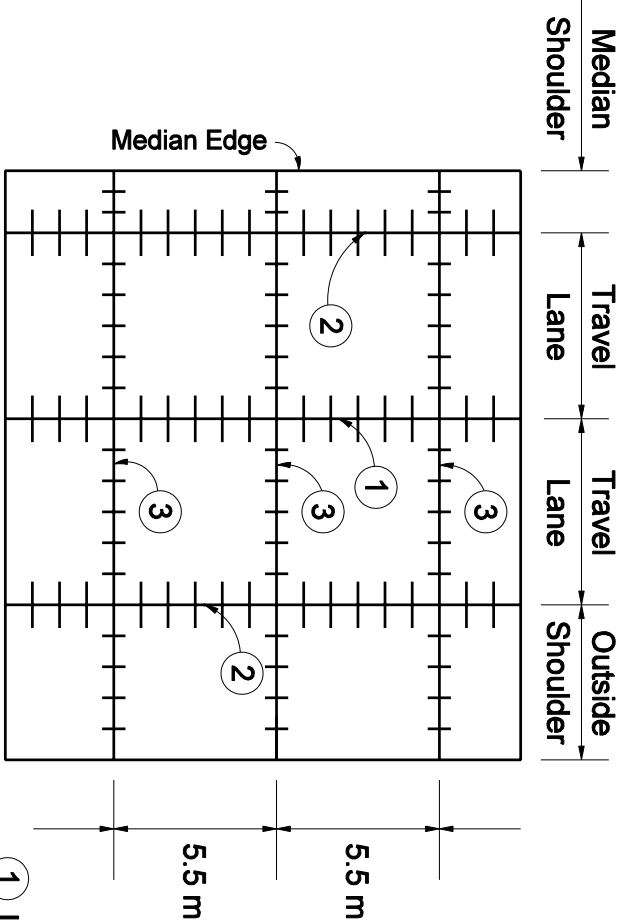


# CURBED PCCP WITH UNDERDRAIN

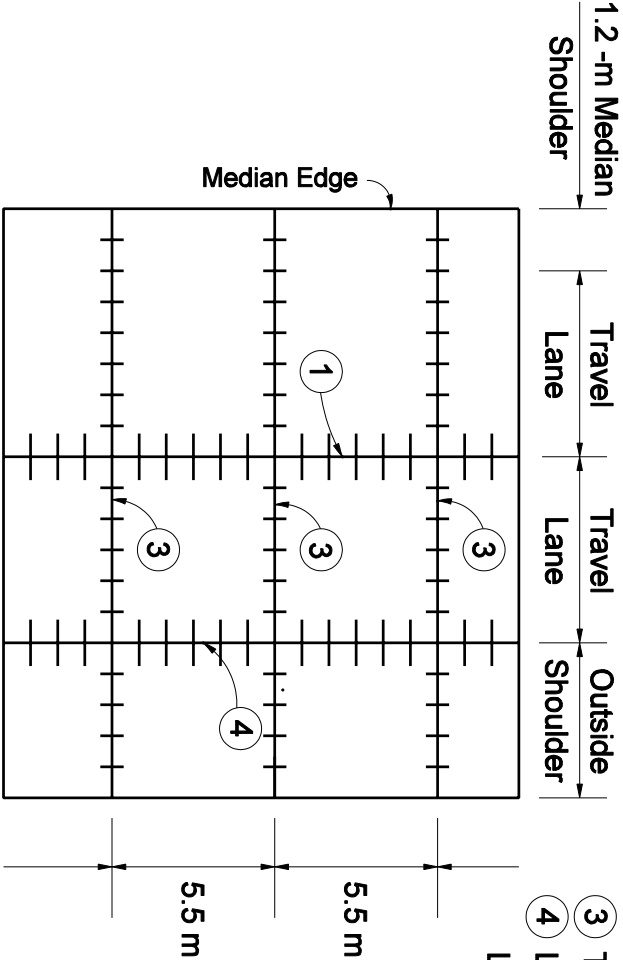
Figure 52-13Q

Note: Option to be determined  
by the contractor.

OPTIONS A AND B:



OPTION C:

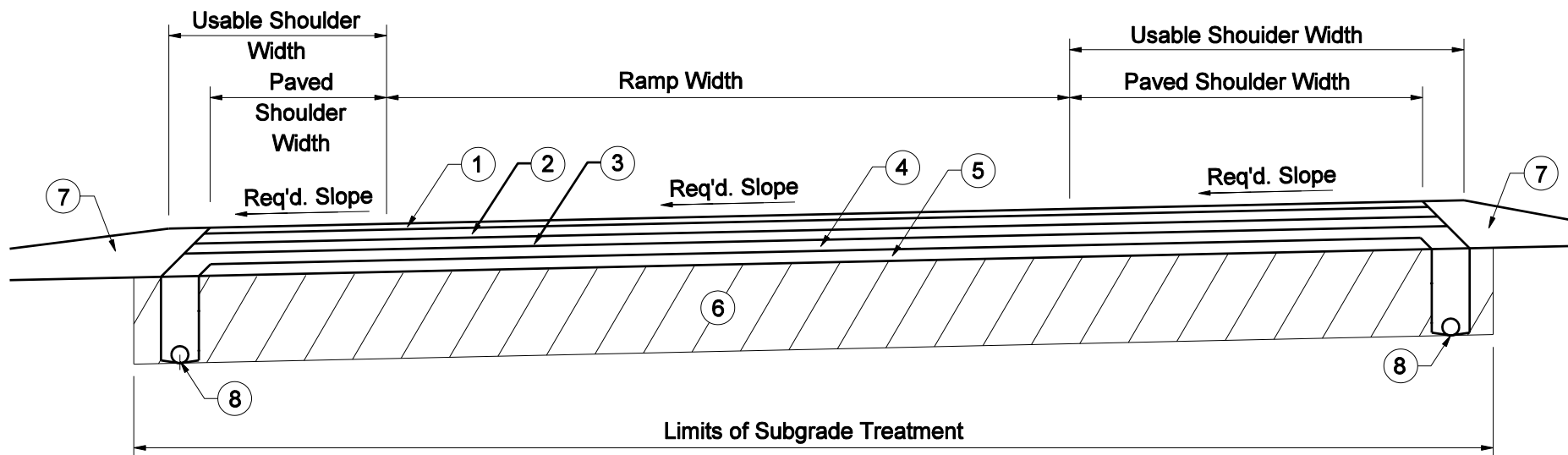


- ① Longitudinal Joint
- ② Option A: Longitudinal Joint
- Option B: Longitudinal Constr. Joint
- ③ Type D-1 Contraction Joint
- ④ Longitudinal Joint or Longitudinal Constr. Joint

MEDIAN EDGE OF CONCRETE PAVEMENT  
LONGITUDINAL JOINT OPTIONS

Figure 52-13R

\* Open graded mixtures OG19.0 mm or OG25.0 mm should be QC/QA-HMA, 5, 76. For all other mixtures, see Section 52-9.02 to determine the appropriate HMA mixture designation.

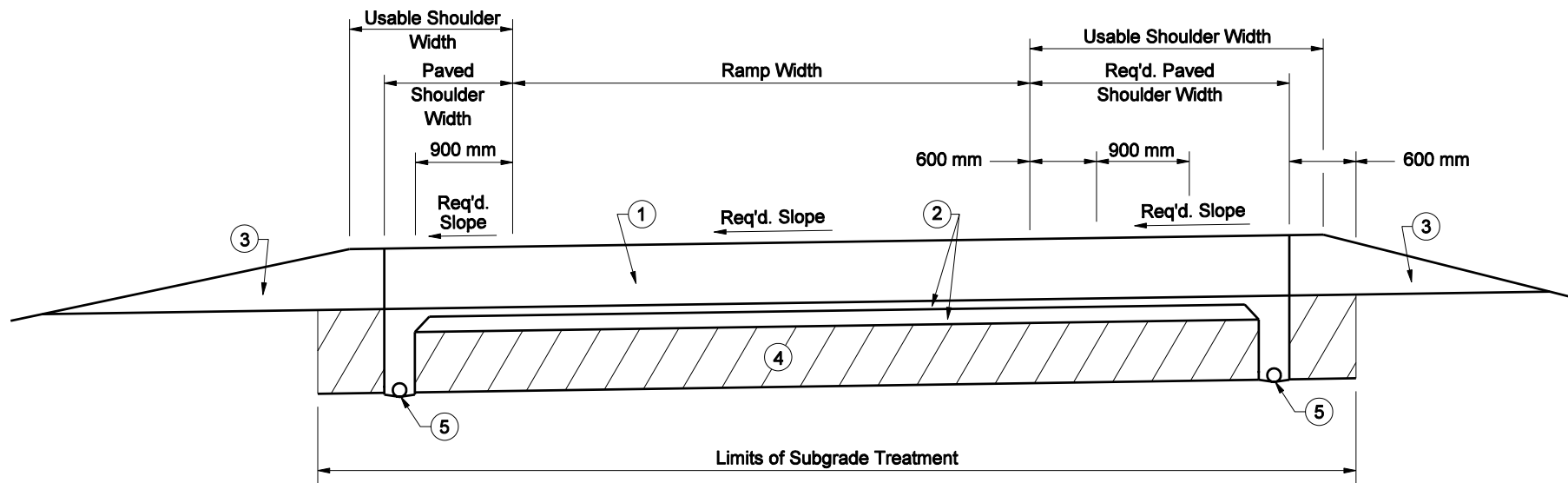


\* Ramp

- ① 90 kg/m<sup>2</sup> HMA Surface 9.5 mm
- ② 150 kg/m<sup>2</sup> HMA Intermediate 19.0 mm
- ③ 180 kg/m<sup>2</sup> Minimum HMA Base 19.0 mm or HMA Intermediate 19.0 mm
- ④ 140 kg/m<sup>2</sup> QC/QA-HMA Intermediate OG19.0 mm
- ⑤ 180 kg/m<sup>2</sup> QC/QA-HMA Base 19.0 mm or HMA Intermediate 19.0 mm
- ⑥ Subgrade Treatment
- ⑦ Variable-Depth Compacted Aggregate, No. 53
- ⑧ Pipe, Type 4, Circular, 150 mm

### FULL-DEPTH HMA RAMP

Figure 52-13S

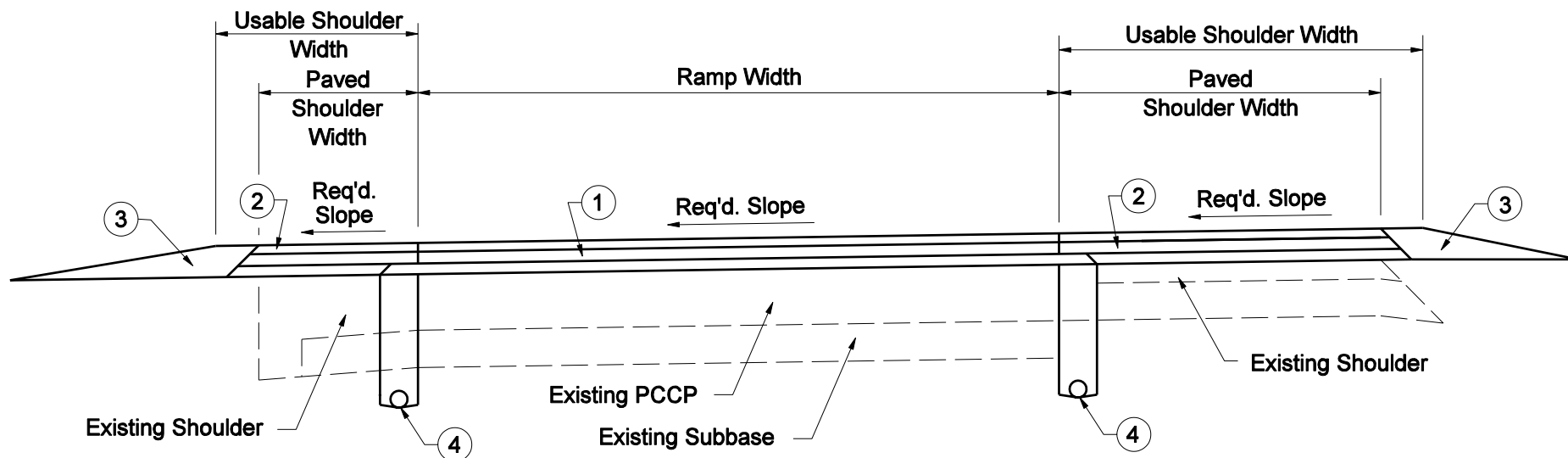
**Ramp**

- ① PCCP
- ② Subbase for PCCP (75 mm Coarse Aggregate, No. 8 on 150 mm Coarse Aggregate, No. 53, Base)
- ③ Variable Depth Compacted Aggregate, No. 53
- ④ Subgrade Treatment
- ⑤ Pipe, Type 4, Circular, 150 mm

**PCCP RAMP****Figure 52-13T**

**Note:**

Open graded mixture OG19.0 mm should be QC/QA-HMA, 5, 76. For all other mixtures, see Section 52-9.02 to determine the appropriate HMA mixture designation.

**Ramp**

- ① 90 kg/m<sup>2</sup> HMA Surface 9.5 mm on
- 120 kg/m<sup>2</sup> HMA Intermediate 12.5 mm on
- 120 kg/m<sup>2</sup> QC/QA-HMA, 5, 76, Intermediate OG19.0 mm

**Shoulder**

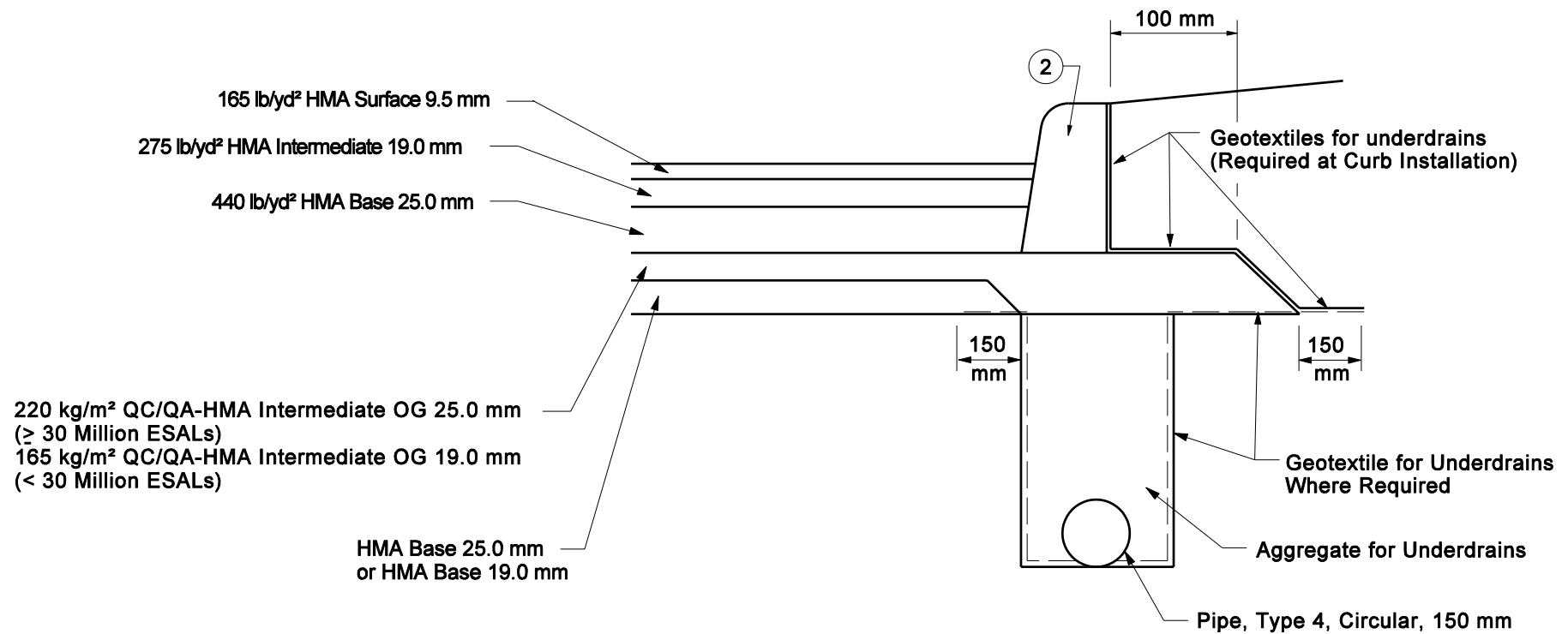
- ② 90 kg/m<sup>2</sup> HMA Surface 9.5 mm on
- 240 kg/m<sup>2</sup> HMA Base 25.0 mm
- ③ Variable-Depth Compacted Aggregate, No. 53
- ④ Pipe, Type 4, Circular, 100 mm (See Figure 52-13K for Retrofit Underdrain Detail)

**RAMP WITH OVERLAY**

Figure 52-13U

**Notes:**

1. Open graded mixtures OG 19.0 mm or OG 25.0 mm should be QC/QA-HMA, 5, 76. For all other mixtures, see Section 52-9.02 to determine the appropriate HMA mixture designation.
2. Concrete Curb and Gutter desirable. Type B curb may be used where drainage is away from it.

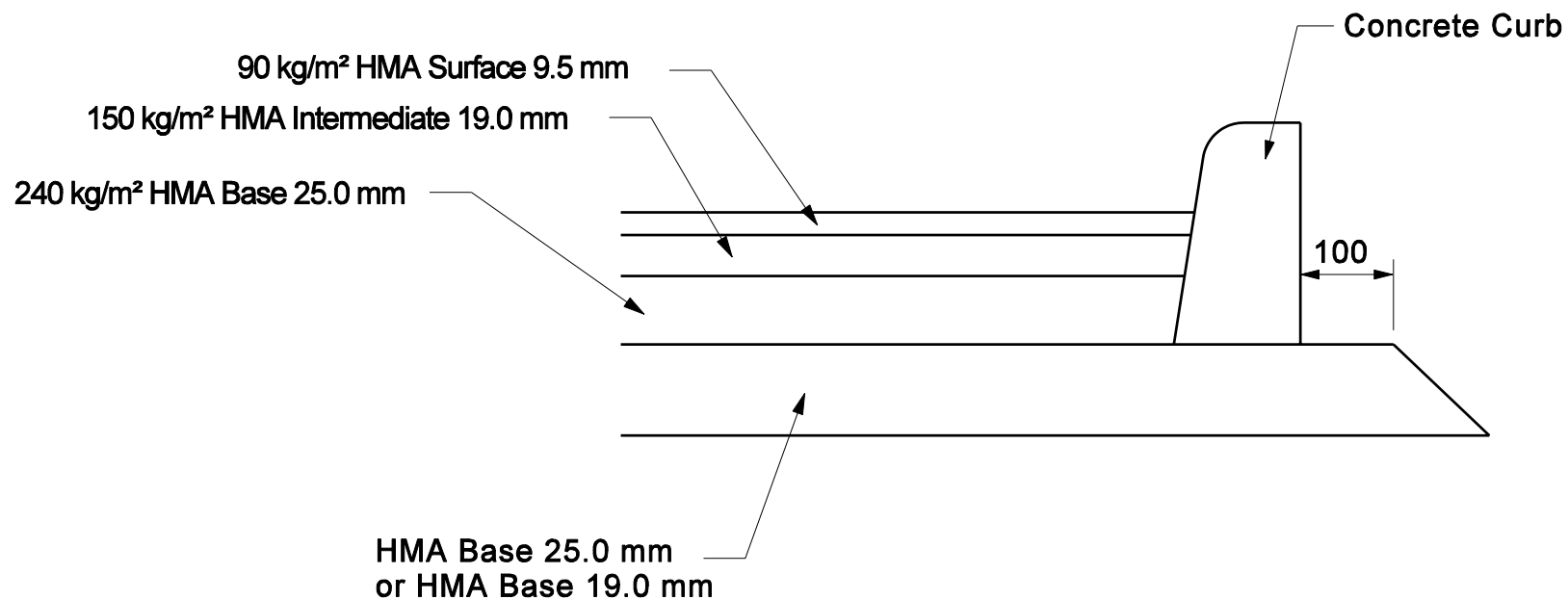


**HMA PAVEMENT WITH CONCRETE CURB  
AND UNDERDRAIN**

**Figure 52-13V**

**Notes:**

See Section 52-9.02 to determine the appropriate HMA mixture designation.



**HMA PAVEMENT WITH CONCRETE CURB  
AND NO UNDERDRAIN**

Figure 52-13W

Light-Duty HMA / Aggregate Composite Section  
(Equivalent to Class II Drive Section):

90 kg/m<sup>2</sup> HMA Surface Type A on  
150 kg/m<sup>2</sup> Intermediate Type A on  
200 mm Min. Compacted Aggregate Base, No. 53

Medium-Duty HMA / Aggregate Composite Section  
(Equivalent to Class IV Drive Section):

90 kg/m<sup>2</sup> HMA Surface Type B on  
150 kg/m<sup>2</sup> Intermediate Type B on  
200 mm Min. Compacted Aggregate Base, No. 53

Heavy-Duty HMA / Aggregate Composite Section  
(Equivalent to Class VI Drive Section):

90 kg/m<sup>2</sup> HMA Surface Type B on  
330 kg/m<sup>2</sup> Intermediate Type B on  
250 mm Min. Compacted Aggregate Base, No. 53

PCCP Section:

150 mm Min. PCCP for Approaches on  
150 mm Dense Grade Subbase

## **PARKING LOT PAVEMENT SECTIONS**

**Figure 52-13X**